SUPPLEMENTARY REPORT

WATER POLLUTION INVESTIGATION

ODEBOLT CREEK AND TRIBUTARY

Below Odebolt

DIVISION OF PUBLIC HEALTH ENGINEERING
IOWA STATE DEPARTMENT OF HEALTH
Des Moines, Iowa

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A INTRODUCTION:

This report is supplementary to the report of investigation of pollution below Odebolt dated December, 1953, and covers additional information concerning the efficiency of operation of the Odebolt sewage treatment plant and sampling of Odebolt Creek and tributary. Samples for chemical and bacterial analyses were collected on October 20, 1954, from the sewage treatment plant and from Odebolt Creek and tributary below Odebolt. Sampling procedures and stations remain the same.

The original report was transmitted to the Odebolt Town Council under date of December 24, 1953. The letter of transmittal called attention to the conclusion in the report that a condition of gross pollution was found to exist and to the recommendation for installation of sewage treatment plant improvements as a means of correcting the pollution condition. Since the filing of the report with the town, representatives of this Department have discussed the matter with the city officials but the Council has taken no steps to correct the gross stream pollution condition that has existed for some time.

B PHYSICAL CONDITION OF ODEBOLT SEWAGE TREATMENT PLANT AND STREAM:

At the time of sampling, the physical condition of the sewage treatment plant and its effluent, as well as that of the stream at each station, was observed and recorded.

At the time of the October 20, 1954, survey, the sewage treatment plant was being partially by-passed. A portion of the septic tank effluent was being by-passed through a defective gate valve in the dosing chamber and discharged to the filter effluent line. Another portion of the flow was being by-passed to a tile line discharging upstream from the filter effluent line.

The septic tank effluent had a light yellow-grey appearance indicating the presence of a considerable amount of milk wastes. The flow of by-passed sewage from the two outlets had the same yellow-grey color.

It was estimated at the time of the survey that the sand filters were treating less than a third of the total flow. Even with this decreased filter loading, the filter effluent contained large amounts of a fungus growth which is a very unusual condition for a sand filter effluent and indicates severe overloading of the filter. The sand filter is greatly overloaded since the rectangular section of the filter now being used has an area of less than 5000 square feet, whereas an area of 31,600 square feet is required for the domestic load of 1300 persons. The area of the existing sand filter thus is about one-sixth that necessary for adequate treatment.

Station 1, established on the tributary above the outlets of the sewage treatment plant, had a flow of clear water with no visible evidence of pollution.

A sample was collected from the tributary approximately 50 feet below the lower outlet. A grey color was imparted to the stream flow by the discharge of the by-passed sewage. During the period of discharge from the sand filter, a considerable number of particles of yellow and grey sewage fungus ranging in size up to ½" in diameter was present in the stream flow. Sludge up to 2 inches in depth was present on portions of the bottom below these outlets and long streamers of grey fungus were attached to sticks and other bottom obstructions. Cattle were observed in the pasture through which this stream flows.

Station 2 is located approximately 600 feet below the outlet of the sewage treatment plant. The stream was light grey colored, the bottom was covered with sewage sludge, and a growth of grey sewage fungus was noted on the sides of the narrow channel indicating a gross pollution condition. Cattle were also observed in this pasture as well as at virtually all other sampling stations downstream.

Station 3 is located at the county road bridge approximately .4 mile below the plant outlet. The same gross pollution condition as noted at the previous station was observed except for a darker appearance of the water and larger amounts of floating sewage fungus.

Station 4, the first station on Odebolt Creek, is located on State Highway 35 bridge approximately 1 mile downstream from the plant outlet. The stream showed some slight improvement in the pollution condition at this point due apparently to the deposition of solids in still areas upstream from this station.

Station 6, located at the north-south county road 1 mile west of Odebolt, again showed a gross pollution condition as evidenced by a dark grey color and large amounts of floating fungus, as well as fungus attached to rocks and sticks in the water. Each square foot of water surface appeared to have 5 to 6 pieces of sewage fungus 1" long and many small pieces which imparted a portion of the grey color to the water.

Station 7, located at the north-south road 2 miles west of Odebolt, showed considerable recovery from the gross pollution condition with the stream showing a slight turbidity and a small amount of fungus attached to the bottom.

Stations 8 and 9, further downstream, showed no visible evidence of pollution. There was a slight turbidity due to silt erosion from the bottom caused by the relatively high flows.

C INTERPRETATION OF CHEMICAL AND BACTERIOLOGICAL DATA:

In table A are tabulated the results of the chemical and bacteriological determinations made on samples collected from the sewage treatment plant and streams.

A sample collected from the septic tank effluent showed an unusually high biochemical oxygen demand (BOD) of 1000 parts per million (ppm) apparently due to milk waste or other industrial wastes. This high BOD is 4 or 5 times greater than that normally expected in an effluent of this type. Samples collected from the 2 by-pass lines showed BOD values of greater than 1000. The sample of sand filter effluent collected at the time the filter was discharging showed a BOD value of 320. Some by-passed septic tank effluent was also flowing in this line at the time of collection.

Station 1 on the tributary stream above the sewage treatment plant outlets showed ample dissolved oxygen and a very low oxygen demand indicating a good stream condition. Addition of the partially treated sewage from the Odebolt sewage treatment plant caused a rapid depletion in dissolved oxygen and an increase to 90 ppm in the BOD value at Station 2. Gradual natural purification took place downstream with the stream again approaching normal oxygen conditions at Station 7.

Coliform bacteria densities were increased by the discharge of partially treated sewage to the extremely high MPN value of 70,000,000 per 100 ml at Stations 2 and 3. These bacterial densities decreased to a low MPN value of 6200 at Stations 8 and 9 which is still considerably higher than normal for streams free of detrimental pollution.

D CONCLUSIONS:

The additional stream investigation and plant observations covered by this supplemental report confirm the conclusions concerning the greatly overloaded condition of the Odebolt sewage treatment plant and the gross pollution condition of Odebolt Creek made in the previous report.

The greatly increased stream flows in Odebolt Creek during this survey did not materially improve or change stream conditions over those prevailing at the time of the sampling during low flows in 1953.

E RECOMMENDATIONS:

It is again recommended that the Town of Odebolt proceed immediately with the construction of sewage treatment facilities adequate to correct the gross pollution conditions in Odebolt Creek and tributary.

R. J. Schliekelman
Public Health Engineer

RJS:bh

Table A - Odebolt Creek below Odebolt - Chemical and Bacteriological Data
October 20, 1954

Station No.	Temp °F	DO ppm	BOD ppm	Coliform MPN per 100 ml
1	55	11.5	1	
Septic tank effluent		0	1000	
Filter effluent		0	320	70,000,000
Upper by-pass		0	>1000	
Lower by-pass		0	>1000	
50' below outlet		0	170	70,000,000
2	61	0.7	90	70,000,000
3	59	0	60	70,000,000
4	59	0	-	2,400,000
6	59	5.3	20	1,300,000
7	59	7.9	2	13,000
8	59	6.7	2	6,200
9	59	7.8	2	6,200